

[66/A-21] Seat No : \_\_\_\_\_

No. of Printed Pages : 02

SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry

(Semester – 3rd) EXAMINATION

Date: 25/11/19, Monday

Course No. : US03CICH02) - OLD

(Chemical Process Principles)

Total Marks: 70

Time: 2.00pm to 5.00 pm

**Q.1 Answer the given multiple choice questions. [10]**

1. 88Kg carbon dioxide is equal to ----- Kgmole.  
a) 2 kgmole      b) 2 gmole      c) 200 kgmole      d) 200 gmole
2. Total volume occupied by a gaseous mixture is equal to the sum of the pure component volume of the component gases is the statement of  
a) Amagate's law      c) Dalton's law  
b) Boyl's Law      d) None of these
3. Specific gravity of liquid is the ratio of  
a) Density of liquid/Density of water      c) Density of water/Density of liquid  
b) Density of liquid/Density of air      d) None of the above
4. Limiting reactant is in less amount than  
a) Stoichiometric requirement      c) Both (a) and (b)  
b) Theoretical requirement      d) None of these.
5. Which of the following is not a unit operation. ?  
a) Steam generation.      c) Pumping of water.  
b) Burning of fuel.      d) Handling of material.
6. Input= Output equation valid for material balance calculation for the process.  
a) without chemical reaction .      c) both (a) and (b).  
b) with chemical reaction.      d) none of these .
7. The capacity of an object to do work is.....  
a) Work.      c) Energy.  
b) Heat.      d) Force.
8. First law of thermodynamics is mathematically stated as  
a)  $dQ=dE+dW$       c)  $dQ=dE-dW$   
b)  $dE=dQ+dW$       d)  $dW=dQ+dE$
9. The process in which amount of moisture is increased in atmosphere is called  
a) Humidification      c) Evaporation  
b) Dehumidification      d) Drying
10. A substance on the surface which the concentration of other substance increases is known as  
a) Pores substance      b) liquid substance      c) Adsorbent      d) Adsorbate

**Q.2 Attempt any Ten. [20]**

- i. Write importance of Basis of Calculations.
- ii. Define: Average Molecular Weight and Partial Pressure.
- iii. Explain importance of Molal Units.
- iv. Define: Continuos process and batch process.
- v. Explain Stoichiometric equation.
- vi. Discuss about Yield and % conversion.

- vii. Explain spontaneous combustion.
- viii. Write about Net and Gross Calorific Value of the fuel.
- ix. Explain Intensive property and Extensive Property.
- x. Draw different types of adsorption isotherms.
- xi. Define: Humid Heat and Humid Volume.
- xii. Explain the terms: Adsorbent , Adsorbate
- Q.3a)** Prove that for an ideal gas Mole % = Volume % = Pressure %. [5]
- b)** A flue gas has the composition CO<sub>2</sub>-80%, CO-16% and N<sub>2</sub>- 4% .All the % are by volume. Find the mole%, weight % and average molecular weight. [5]
- OR**
- Q.3a)** Name and explain different methods used to express the composition of solution and mixtures. [10]
- Q.4a)** List different steps which should be followed to solve different material balance problems. [5]
- b)** Write a note on: Recycle operation and its importance. [5]
- OR**
- Q.4a)** The feed to a continuous fractionating column contains 28 % benzene and 72 % toluene by weight .The distillate contains 52 % benzene and bottom product contains 5% benzene. Calculate the amount of distillate and bottom product per 1000 kg of feed/hr. Also find % loss of benzene. [5]
- b)** Write about Bypass Operation. [5]
- Q.5a)** Discuss about different types of energy. Also write the difference between the point function and path function. [10]
- OR**
- Q.5a)** Write a note on : Combustion reactions. [5]
- b)** Derive an equation for efficiency of heat engine. [5]
- Q.6a)** Explain humidification and dehumidification. [5]
- b)** Write a note on: Langmuir Adsorption Isotherm. [5]
- OR**
- Q.6a)** Write the difference between physical and chemical adsorption. Also discuss industrial applications of adsorption. [10]

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